Jared Weis

Jared Weis, PhD, joined the Department of Biomedical Engineering at Wake Forest School of Medicine in Fall 2017. The overall theme of research within the Weis lab is concentrated in developing and deploying computational modeling and non-invasive imaging methodologies to explore the nature of soft-tissue mechanics in cancer, with an emphasis on driving clinical therapeutic interventions. Research projects focus on the multi-disciplinary study of the multi-scale influences of mechanics in cancer progression and response to therapy, involving the development and validation of imaging-based mathematical modeling approaches that evaluate quantitative parameterization of cancer growth and therapy response properties based on observational imaging measurement data (optical, X-ray computed tomography, and/or magnetic resonance imaging). Utilizing a mathematical modeling framework that incorporates mechanical signaling from the surrounding tissue microenvironment, predictions of the eventual response of cancer to therapy can be made with an overall goal of directing therapeutic intervention. The lab employs a mixed experimental/computational approach towards modeling and parameterization, and spans the length scale of cancer from preclinical in vitro cancer cell and in vivo cancer model systems to translational clinical-based investigations within the scope of three main projects:

1. Multi-scale imaging-based biophysical modeling to predict the response of breast cancer to chemotherapy
2. Mechanical stiffness as a biomarker to evaluate and predict breast cancer therapeutic response
3. Imaging-based biophysical modeling to differentiate tumor recurrence from pseudo-progression following stereotactic radiosurgery for intracranial metastasis